UNIVERSITY OF Southampton

Doctoral Programme in Educational Psychology

What is the effectiveness of the Talk Boost intervention on children's language development?

Emma Woozley. Academic critique, submitted October 2023

It has long been suggested that social deprivation has adverse effects on child development, leaving children from low income backgrounds at a disadvantage compared to their more affluent peers (Roseberry-McKibbin, 2012). One particularly affected area is language. On average, children from lower socioeconomic status (SES) families hear a lower quality and quantity of language compared to children from higher SES families (Hart & Risley, 1995; Rowe, 2012), leading to poorer language comprehension and production (Pace et al., 2017). The link between deprivation and language delay in the early years is concerning, given that the attainment gap remains stable or increases over time (Walker et al., 1994), and predicts future educational outcomes (Bleses et al., 2016).

Perpetuating this gap is the effect of the Covid-19 lockdowns, with the full impact still emerging (I CAN, 2021). Not only has it been suggested that the number of year one children requiring speech and language support has increased by ten percent from the 2020 to 2021 academic year to the 2021 to 2022 academic year (Clarke et al., 2022), the attainment gap between disadvantaged children and their peers has grown (Education Endowment Foundation, 2022). Therefore, robust, feasible and evidence-based interventions aimed at closing the attainment gap in language are more critical than ever.

What is Talk Boost?

Speech and Language UK (formally known as I CAN), a children's communication charity, created Talk Boost (TB) as an intervention to develop children's language skills, with a particular focus on enabling children with delayed language and communication to catch up with their peers (Speech and Language UK, 2023). Depending on age, TB is differentiated into three forms: Early TB, suitable for children aged three to four, TB Key Stage (KS) One, for children aged four to seven, and TB KS Two, for children aged seven to ten. For the purpose of this critique, 'TB' will refer to all forms of the intervention.

All versions of TB follow the same format, in that children with delayed language are identified by school staff to partake in a small group intervention approximately three times per week for eight to ten weeks. The group is run by a teacher or teaching assistant who has attended a day of training delivered by a licensed tutor, and subsequently follows an intervention guide for session plans (Speech and Language UK, 2023). To run TB, schools pay £550.00 for the appropriate intervention pack for their setting as well as the cost of the training, which is individually set by licensed tutors (Speech and Language UK, 2023). The intervention falls under targeted support, meaning that it is generally not suitable for pupils with speech and language disorders, such as developmental language disorder, but instead for those pupils who are expected to be able to catch up with their peers with some support.

TB aims to accelerate children's progress in language by focusing specifically on attention and listening, vocabulary, syntax, narrative skills and conversational skills (Speech and Language UK, 2022). The programme offers children direct, 'hands on' experiences alongside visuals to support their language development; an example session plan can be seen in appendix A. Various

activities are also provided for parents and the class teacher to permeate the language input to the child's wider environment (Speech and Language UK, 2023).

Theoretical underpinnings

Speech and Language UK do not explicitly identify the psychological theories that underpin TB's effectiveness. However, three crucial pedagogical elements of the intervention acknowledged are: children learn through being actively involved and engaged in activities, children learn from responsive adults, and children learn from adults modelling language (Early TB, 2015). Based on these principles, intervention effects could be explained by constructivism (Piaget, 1951; Vygotsky, 1978), operant conditioning (Skinner, 1965), zone of proximal development (ZPD) and scaffolding (Vygotsky, 1978).

According to Piaget (1951), children are thought to be active learners who acquire language through involvement in enjoyable activities. TB adopts these Piagetian principles through encouraging children's participation in active, language-rich activities such as problem-solving, discussions and storytelling (Speech and Language UK, 2022). Children are also supported to semantically link new vocabulary to their existing schemas, such as by being encouraged to explore similarities with known words or determine a word's category (Speech and Language UK, 2022). Linking new to existing vocabulary encourages children to assimilate new words into their existing knowledge, or accommodate existing schemas to take into account the new vocabulary, thought to lead to better retention of novel language (Nash & Snowling, 2006). Furthermore, the group nature of the intervention fosters social interaction in support of language learning (Vygotsky, 1978), particularly through the conversational elements of the sessions.

Adults can be responsive to a child's learning in multiple ways, including pitching their instruction and mediation at an appropriate level, as well as responding fittingly to desired learning behaviours (Stremmel & Fu, 1993). Vygotsky (1978) proposed that with guidance from a more knowledgeable other, children can accomplish tasks and acquire skills within their ZPD that they would not achieve otherwise. TB is designed to identify each child's ZPD through assessment at the beginning of the intervention, in addition to progress monitoring throughout. This allows the lead adult to responsively tailor the intervention to target the group and individual child's ZPD so that an appropriate amount of challenge to facilitate learning and language development is provided. One method used to scaffold a learner's language learning within their ZPD is through adult modelling, thought to be a key driver of language development (Justice & Cabell, 2022). As a more knowledgeable other, the adult leading the TB group scaffolds learner language through modelling desired skills, such as more sophisticated vocabulary and longer sentences (Speech and Language UK, 2022).

During the TB training, adults are also instructed to give clear, specific, and process-driven praise to children (Speech and Language UK, 2022), which aims to positively reinforce desired behaviours (Robins, 2012). For example, when focusing on attention and listening, children are given clear steps to follow (e.g., sitting still and looking) that can then be clearly praised by the leading adult. For the child, doing so makes it more apparent which actions should be repeated, thus promoting behaviours that can support language development.

Systematic literature search

A systematic literature search was conducted to understand and evaluate the evidence base for TB (see appendix B). To perform the systematic search, the Boolean operators in appendix C were used within the following databases: Education Resources Information Center (ERIC), Medline, Cumulated Index to Nursing and Allied Health Literature (CINAHL), PsychInfo and ProQuest (including grey literature). In addition, the TB website was hand-searched for other research on the intervention's effectiveness.

In total, 77 records were screened from databases, eight were assessed for eligibility based on the inclusion and exclusion criteria (see appendix D), and three were included in the final review. Three additional studies were found on

the TB website. On close inspection of these reports, it was noted that the participant numbers and procedures were almost identical to the obtained journal articles and so the corresponding author for the journal articles was directly contacted for clarification. It was confirmed that the reports on the TB website outlined the same study as the published articles and so it was decided that only the latter would be included within this review given that they would have been peer-reviewed.

Three controlled studies were included within this review. The key data from each study were extracted and displayed in a table (appendix E) and each study was quality-assessed using the Downs and Black (1998) checklist (appendix F). Children taking part in the studies were aged between three to ten years old and all resided within the United Kingdom, many within socially deprived areas. All children involved were chosen to take part in the research by their teachers, who recognised them as having delayed language following training by researchers on how this may present, mirroring how children would be selected for the intervention in practice. Two out of three of the studies adopted exclusion criteria whereby children with language disorders or language delay secondary to other needs were not selected to participate, reflecting TB's criteria for intervention participation.

Each study used a cluster randomised-controlled trial design in that whole schools, rather than individual pupils, were allocated to the intervention group (IG) or waitlist control group (WCG) who received TB following the research. Doing so likely reduced the risk of contamination, whereby the WCG indirectly receive effects of the intervention (Christie et al., 2009). The intervention schools in each study ran TB three times per week, delivered by a trained teacher, teaching assistant or nursery practitioner to small groups of children. The duration of the intervention slightly differed depending on the specific programme but ran for between eight to ten weeks. Within each study, formal assessments were conducted by speech and language therapists (SALTs), supervised SALT assistants or SALT students who were all blind to the condition each child belonged to thus increasing the objectivity of findings (Schulz, 2001).

TB KS1

Lee and Pring (2016) assessed the effectiveness of the KS1 TB intervention using a sample consisting of 180 children across 18 schools, with 72 children allocated to the IG and 69 children to the WCG. A further 39 children with EAL were also allocated to the IG as only two schools had large numbers of pupils with EAL and both schools were randomly allocated to the IG. Participants were formally assessed using the Renfrew Action Picture Test and Bus Story, which both primarily measure expressive rather than receptive language (Hayward et al., 2008; Jordan & Coulter, 2016). On the initial assessment, 10 IG and 16 WCG children obtained scores above the mean for their age on at least two of the measures thus were excluded from the analysis, citing selection error by nursery staff. Children with English as their first language in the intervention group showed significantly greater improvements across all ages and measures, with large effect sizes. Children with EAL in the IG also showed significantly greater improvements than controls for all ages and measures apart from the Bus Story measure with year one pupils, where the control group performed unexpectedly well.

This study provides initial promising evidence for TB KS1 in supporting expressive language for pupils with English as their first language and those with EAL. However, these findings must be treated with caution as there was a highly unequal split of EAL pupils between the IG and WCG. It is possible that the EAL pupils may have made more progress due to having lower pre-intervention scores compared to the control group, leading to vaster improvements in the outcome measures. Additionally, given that a formal measure of receptive language was not used, the impact of the intervention on children's understanding of language is still unclear.

Early TB

Reeves et al., (2018) conducted a trial to assess the effectiveness of the Early TB intervention. 85 children across 15 nurseries were randomly

assigned to either the IG, where they received the Early TB intervention, or the WCG. The groups were roughly equally split, with 45 children in the IG and 40 children in the WCG. Unlike the two other studies in this review, the sample included four participants with special educational needs with one in the intervention group and three in the control group. Parents of the children in the IG were invited to a training session to support their child's language, though only 14 out of 45 parents were able to attend. Participants in both the IG and WCG were assessed using the Pre-school Language Scales pre and post intervention, which measure both receptive and expressive language. Analysis of scores showed that children in the IG were significantly more likely to have improved scores post intervention compared to the WCG for both receptive and expressive language, with large effect sizes.

From this, it can be tentatively suggested that Early TB supports children's language development more effectively than teaching as usual. In fact, due to the low number of parents able to attend the training session, this study may even underestimate the impact of the intervention when it is delivered as intended.

TB KS2

Reeves et al., (2019) also assessed the KS2 TB intervention. The sample consisted of 162 children across 21 schools, with 85 children in the IG and 75 in the WCG. Whilst the groups were equally matched on many factors such as age and gender, the IG contained significantly more EAL pupils than the WCG. All participants were assessed pre and post intervention using four subtests of the Assessment of Comprehension and Expression (ACE) and the fluency and comprehension elements of the York Assessment of Reading for Comprehension (YARC). To triangulate this data, the participants' teachers completed the Speech, Language and Communication Progression Tool (SLCPT) and the Learning Behaviour Checklist (LBC) pre and post intervention. All staff also completed a Staff Outcomes Questionnaire (SOQ) before and after the intervention, assessing their confidence in identifying pupils with low language skills. A parent rating scale was also used with the IG, though this data will not be included here as it was not controlled using the WCG.

Overall, one participant withdrew from the study prior to group allocation, and 27 children (10 IG, 17 WCG) were withdrawn due to a lack of attendance to intervention sessions or post-intervention data collection. Statistical analyses showed that there was no significant difference between the IG and WCG on any of the formal assessments, aside from the SLCPT whereby the IG improved significantly more than the WCG on all but one of the subscales. Participants in the IG were also more likely to have improved scores on the teacher-rated LBC post intervention compared to the WCG. In both the IG and WCG, staff members increased in confidence with identifying and supporting language needs, though the difference between the groups was not statistically analysed. From this, it appears that there may be limited evidence for TB KS2 as the only significant effects that were observed were from measures completed by teachers, who were not blind to whether the child was in the IG or WCG.

Common limitations of the TB evidence base

Across all studies, there were several methodological issues that may impact the reliability and validity of the findings. Firstly, none of the studies measured the fidelity to the intervention design, meaning it is not known how accurately the intervention was delivered thus questioning whether the encouraging effects were due to the TB intervention itself, or possible adaptations that those delivering made. Secondly, a common theme among the studies was a lack of follow-up data, thus leading to questions about whether the effects of TB are enduring. Furthermore, all studies mentioned used a WCG to understand the effectiveness of their intervention. Whilst this proves helpful in knowing whether TB is more beneficial than teaching as usual, it does not offer insights into how the intervention compares to other programmes targeting the same area. Lastly, multiple participants were excluded from analyses due to factors such as missing intervention sessions or scoring in the average range in the pre-intervention assessment.

Removing these participants from analyses, rather than adopting an 'intention to treat' analysis, may have meant that type two errors were more likely (Fergusson et al., 2002) thus making the intervention appear more effective than in practice.

Implications for Professional Practice

There is currently too little evidence for professionals to draw firm conclusions about the effectiveness of TB. However, given that both the Early TB and TB KS1 appeared to have more promising effects than TB KS2, one may tentatively wonder about the importance of early identification and support for delayed language. Previous literature on language delay emphasises the importance of early intervention for these children (Kaiser et al., 2022; Vermeij et al., 2023), maintaining the sentiment that intervening as early as possible is crucial not just for TB, but across all language interventions.

Research suggests that schools often succumb to implementing interventions that are informed by trends, rather than evidence (Pegram et al., 2022). As scientist-practitioners, educational psychologists (EPs) are well-placed to support schools to adopt interventions that are evidence-informed. EPs can consider a school's aims for implementation of a language intervention and advise whether TB fits the criteria, particularly given the initial expense of the programme. For example, there is not enough evidence suggesting that TB KS1 supports receptive language and so schools aiming to improve outcomes in this area may be advised to use a different intervention that has been empirically shown to be effective for receptive language. Whilst TB does not yet have a large evidence base, EPs may encourage schools to use a 'plan, do, review' approach to consider whether the intervention is effective for children in their settings, particularly in the long term (Department for Education & Department of Health, 2015). Doing so would reduce the possibility of precious time and resources being mis-used on ineffective support, which is crucial given the importance of early intervention (Kaiser et al., 2022). Furthermore, EPs can signpost schools to further research that is published around TB as it arises, such as the large-scale trial on Early TB that is currently being conducted (Education Endowment Foundation, 2023).

Conclusion

In summary, the TB intervention appears promising in improving language skills in children with delayed language in both its theoretical underpinnings and empirical research, particularly for Early TB and TB KS1. However, its absolute effectiveness, particularly for TB KS2, remains inconclusive given the methodological limitations and small number of studies. Further controlled research on larger samples that addresses the raised methodological concerns is necessary to better establish the effectiveness of TB. Whilst the evidence base grows, EPs are well-placed to support schools with the potential use of TB through encouraging early intervention for language delay, ensuring the intervention aligns with the school's desired outcomes and endorsing ongoing intervention monitoring to maximise resources.

To cite this work, please use the following:

Woozley, E. (2024, 5 December). What is the effectiveness of the Talk Boost intervention on children's language development? *University of Southampton Educational Psychology research blog*.https://blog.soton.ac.uk/edpsych/2024/12/05/what-is-the-effectiveness-of-the-talk-boost-intervention-on-childrens-language-development

References

Bleses, D., Makransky, G., Dale, P. S., Højen, A., & Ari, B. A. (2016). Early productive vocabulary predicts academic achievement 10 years later. *Applied Psycholinguistics*, *37*(6), 1461–1476. https://doi.org/10.1017/S0142716416000060

Christie, J., O'Halloran, P., & Stevenson, M. (2009). Planning a cluster randomized controlled trial: Methodological issues. *Nursing Research*, *58*(2), 128. https://doi.org/10.1097/NNR.0b013e3181900cb5

Clarke, V., Lynch, P., & Bradshaw, P. (2022, November 7). Child speech delays increase

following lockdowns. *BBC News*. https://www.bbc.com/news/education-63373804

Department for Education & Department of Health. (2015). *Special educational needs and disability code of practice: 0 to 25 years statutory guidance for organisations which work with and support children and young people who have special educational needs or disabilities*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/398815/SEND_Code_of_Practice_January_2015.pdf

Downs, S. H., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology and Community Health*, *52*(6), 377–384.

Early Talk Boost. (2015). *Early Talk Boost evaluation report*. https://speechandlanguage.org.uk/media/2949/early-talk-boost-evaluation2015.pdf

Education Endowment Foundation. (2022). *The impact of covid-19 on learning: A review of the evidence*. https://d2tic4wvo1iusb.cloudfront.net/production/documents/guidance-for-teachers/covid-19/Impact_of_Covid_on_Learning.pdf?v=1695644862

Education Endowment Foundation. (2023). *Evaluation of early talk boost efficacy: Trial evaluation protocol*. https://d2tic4wvo1iusb.cloudfront.net/production/documents/projects/Early-Talk-Boost-protocol-FINAL.pdf?v=1697425212

Fergusson, D., Aaron, S. D., Guyatt, G., & Hébert, P. (2002). Post-randomisation exclusions: The intention to treat principle and excluding patients from analysis. *BMJ : British Medical Journal*, *325*(7365), 652–654.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children* (pp. xxiii, 268). Paul H Brookes Publishing.

Hayward, D., Stewart, E., Phillips, L., Norris, S. P., & Lovell, M. (2008). At-a-glance test review: The Renfrew Bus Story (RBS). *Language, Phonological Awareness, and Reading Test Directory*, 1–4.

I CAN. (2021). *Speaking up for the Covid generation*. https://speechandlanguage.org.uk/media/3753/speaking-up-for-the-covid-generation-i-can-report.pdf

Jordan, J.-A., & Coulter, L. (2016). Individual differences in speech and language ability profiles in areas of high deprivation. *Child Care in Practice*, *23*, 1–14. https://doi.org/10.1080/13575279.2016.1188759

Justice, L. M., & Cabell, S. Q. (2022). Educational interventions targeting language development. In C. McKean, J. Law, & S. Reilly (Eds.), *Language Development: Individual Differences in a Social Context* (pp. 519–538). Cambridge University Press. https://doi.org/10.1017/9781108643719.026

Kaiser, A. P., Chow, J. C., & Cunningham, J. E. (2022). A case for early language and behavior screening: Implications for policy and child development. *Policy Insights from the Behavioral and Brain Sciences*, *9*(1), 120–128. https://doi.org/10.1177/23727322211068886

Lee, W., & Pring, T. (2016). Supporting language in schools: Evaluating an intervention for children with delayed language in the early school years. *Child Language Teaching and Therapy*, *32*(2), 135–146. https://doi.org/10.1177/0265659015590426

Nash, H., & Snowling, M. (2006). Teaching new words to children with poor existing vocabulary knowledge: A controlled evaluation of the definition and context methods. *International Journal of Language & Communication Disorders*, *41*(3), 335–354. https://doi.org/10.1080/13682820600602295

Pace, A., Luo, R., Hirsh-Pasek, K., & Golinkoff, R. M. (2017). Identifying Pathways Between Socioeconomic Status and Language Development. *Annual Review of Linguistics*, *3*(1), 285–308. https://doi.org/10.1146/annurev-linguistics-011516-034226

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The

PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*, n71. https://doi.org/10.1136/bmj.n71

Pegram, J., Watkins, R. C., Hoerger, M., & Hughes, J. C. (2022). Assessing the range and evidence-base of interventions in a cluster of schools. *Review of Education*, *10*(1), e3336. https://doi.org/10.1002/rev3.3336

Piaget, J. (1951). *Play, dreams and imitation in childhood* (Vol. 25). Routledge.

Reeves, L., Freed, J., Wright, J., Wood, E., Black, R., Hartshorne, M., & Adams, C. (2019). Feasibility and evaluation of Talk Boost KS2: A school-based programme for oral language skills in children with low-average communication skills in Key Stage 2. *Child Language Teaching and Therapy*, *35*(3), 221–240. https://doi.org/10.1177/0265659019874851

Reeves, L., Hartshorne, M., Black, R., Atkinson, J., Baxter, A., & Pring, T. (2018). Early talk boost: A targeted intervention for three year old children with delayed language development. *Child Language Teaching and Therapy*, *34*(1), 53–62. https://doi.org/10.1177/0265659018755526

Robins, G. (2012). *Praise, motivation and the child*. Taylor & Francis Group.

Roseberry-McKibbin, C. (2013). *Increasing language skills of students from low-income backgrounds: Practical strategies for professionals, second edition* (2nd ed.). Plural Publishing.

Rowe, M. L. (2012). A longitudinal investigation of the role of quantity and quality of child-directed speech in vocabulary development. *Child Development*, *83*(5), 1762–1774. https://doi.org/10.1111/j.1467-8624.2012.01805.x

Schulz, K. F. (2001). Assessing allocation concealment and blinding in randomised controlled trials: Why bother? *BMJ Evidence-Based Medicine*, *5*(2), 36–38. https://doi.org/10.1136/ebm.5.2.36

Skinner, B. F. (1965). *Science and human behavior*. Simon and Schuster.

Speech and Language UK. (2022). *Talk Boost KS1 practitioner training*. https://speechandlanguage.org.uk/media/4375/talk-boost-ks1-practitioner-handout_speech-and-language-uk-22.pdf

Speech and Language UK. (2023). *Talk Boost speech and language interventions*. https://speechandlanguage.org.uk/talk-boost/

Stremmel, A. J., & Fu, V. R. (1993). Teaching in the zone of proximal development: Implications for responsive teaching practice. *Child and Youth Care Forum*, *22*(5), 337–350. https://doi.org/10.1007/BF00760943

Talk Boost. (n.d.). *Resource guide*. https://speechandlanguage.org.uk/media/1795/tb-resource-guide.pdf

Vermeij, B. A. M., Wiefferink, C. H., Knoors, H., & Scholte, R. H. J. (2023). Effects in language development of young children with language delay during early intervention. *Journal of Communication Disorders*, *103*, 106326. https://doi.org/10.1016/j.jcomdis.2023.106326

Vygotsky, L. S. (1978). *Mind in society: Development of higher psychological processes*. Harvard University Press.

Walker, D., Greenwood, C., Hart, B., & Carta, J. (1994). Prediction of school outcomes based on early language production and socioeconomic factors. *Child Development*, *65*(2), 606–621. https://doi.org/10.2307/1131404

Appendices

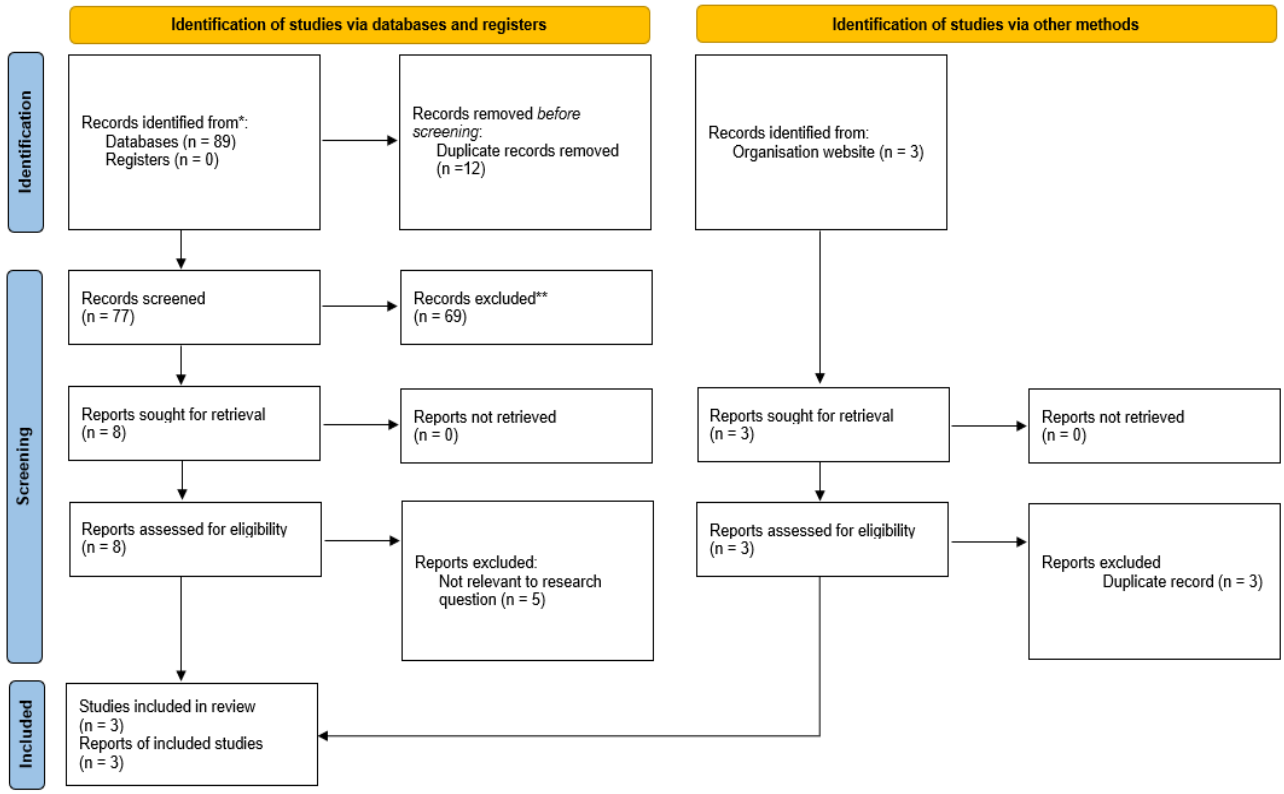
Appendix A

Talk Boost Key Stage 1 Example Sessions (Talk Boost, n.d.)

	Activity outline		
Targeted Area	**Week 1**	**Week 2**	**Week 3**
Introduction	Introduction Group rules Learning aims	Introduction Review learning aims	Introduction Review learning aims
Listening	Introduction to good listening Good listening activity	Matching musical instruments	Listen for…simple stories
Vocabulary	Introduction to vocabulary Sorting game	Word bingo	Matching pairs
Building sentences	Introduction to building sentences Add an adjective		Tell me what to do
Telling stories		Introduction to telling stories Sandwich sequence game	
Conversations	Finding out about each other	Finding out about each other	Special person
Review	What do we know? How did we do? Choose one game	What do we know? How did we do? Choose one game	What do we know? How did we do? Choose one game

Appendix B

PRISMA diagram outlining systematic search strategy (Page et al., 2021)



Appendix C

Search Terms Used in Database Search Strategy

(child* OR pupil OR student OR primary-age* OR primary age* OR primary school-age* OR primary school age* OR pre-school age* OR pre-school* OR preschool OR early year* OR early-year* OR kindergarten*)
AND (“talk boost” OR talkboost OR talk-boost)

Appendix D

Inclusion and Exclusion Criteria Used for the Systematic Search

Inclusion Criteria	Exclusion Criteria
Participants aged between 3 and 10 years old, ideally with delayed language	Participants were younger than 3 or older than 10 years old
Quantitative, empirical research	Qualitative research or data (includes qualitative elements of mixed-method studies)
Presence of a control or comparison group	Non-empirical papers (e.g., book chapters)
Paper available in English	No control or comparison group
Assessed the efficacy of the ‘Talk Boost’ intervention	Paper not available in English
Assessed language skills	No specific mention of ‘Talk Boost’
Study conducted in an education setting (i.e., school, nursery, pre-school, children’s centre)	Did not assess language skills
Full text accessible	Not carried out in an education setting
	Full text unavailable

Appendix E

Data Extraction Table for Included Studies

	Lee et al., (2016)	**Reeves et al., (2018)**	**Reeves et al., (2019)**
Geographic location	West Yorkshire and Lancashire	North and north east of England	Kirkby, York, Leeds and Somerset
Age of participants	Reception to year 2	Mean age 42.1 months	7 to 10 years
Sample size	18 schools 180 children	15 nurseries 85 children	21 schools 162 children
Selection criteria	Children identified by their class teachers as having delayed language	Children identified by early years practitioner in each setting as having delayed language	School staff identified children with any observed difficulties in listening or paying attention, vocabulary development or understanding language and then completed the Speech, Language, Communication Progression tool (SLCPT) for each chosen child
Exclusion criteria	Children with a language impairment or children with speech, language and communication needs secondary to learning, sensory or physical needs	N/A	Participants with known conditions were excluded from this study e.g., developmental speech and/or language disorders with existing specialist support, specific language impairment, autism spectrum condition, long term significant cognitive and learning difficulties
Intervention	Talk Boost KS1	Early Talk Boost	Talk Boost KS2
Frequency of intervention	3 times per week	3 times per week	3 times per week
Duration of intervention	10 weeks	9 weeks	8 weeks
Who delivered the intervention	Teachers or teaching assistant	Nursery practitioners	Teachers or teaching assistant
Group size	4	5-7	4
Condition sizes (following reassessment)	111 intervention (including 39 EAL), 69 control	45 intervention, 40 control	87 intervention, 75 control
Control group task	Waitlist	Waitlist	Waitlist
Fidelity	Not known	Not known	Not known

Measured outcomes	Renfrew Action Picture Test and Bus Story conducted by blinded speech and language therapists (SALTs)	Pre-School Language Scale 4 conducted by blinded SALTs and SALT students under supervision	4 subtests of Assessment of Comprehension and Expression (ACE) and York Assessment of Reading for Comprehension (YARC) completed by blinded SALTs and SALT students under supervision SLCPT and Learning Behaviour Checklist completed by teacher or TA Staff outcomes questionnaire Parent rating scale
Attrition or exclusion from analyses	10 intervention and 16 control excluded from analyses due to scores above the mean for their age on 2 or more measures	N/A	1 withdrew before group allocation 10 intervention participants and 17 control participants withdrawn due to lack of attendance for intervention sessions or follow up assessment
Statistical analyses	MANOVA and separate ANOVAs on each dependent variable	ANOVAs	Chi-squared to compare categorical data Mann-Whitney U tests T-tests Descriptive outcomes
Results	Children in intervention group significantly more likely to have higher scores post intervention (including EAL pupils) across reception, year 1 and 2	Children in intervention group significantly more likely to have higher scores post intervention	No significant difference on formal assessors between intervention and control groups apart from SLCPT Teacher rated scores improved, but they were not blind to condition
Effect sizes	Large	Large	N/A
Follow up	None	None	None
Downs and Black (2018) score	21	22	19

Appendix F

Downs and Black (1998) Quality Assurance Checklist for Included Studies

	Reeves et al., (2018)	Reeves et al., (2019)	Lee et al., (2016)
Is the hypothesis/aim/objective of the study clearly described?	Yes	Yes	Yes
Are the main outcomes to be measured clearly described in the Introduction or Methods section?	Yes	Yes	Yes
Are the characteristics of the subjects included in the study clearly described?	Yes	Yes	Yes
Are the interventions of interest clearly described?	Yes	Yes	Yes
Are the distributions of principal confounders in each group of subjects to be compared clearly described?	Yes	Yes	Yes
Are the main findings of the study clearly described?	Yes	Yes	Yes
Does the study provide estimates of the random variability in the data for the main outcomes?	Yes	Yes	Yes
Have all important adverse events that may be a consequence of the intervention been reported?	Yes	Yes	Yes
Have the characteristics of subjects lost to follow-up been described?	Yes	No	Yes
Have actual probability values been reported (e.g., 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	Yes	Yes	No
Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	Not known	Not known	Not known
Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	Not known	Not known	Not known
Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?	Yes	Yes	Yes
Was an attempt made to blind study subjects to the intervention they have received?	No	No	No
Was an attempt made to blind those measuring the main outcomes of the intervention?	Yes	Yes	Yes
If any of the results of the study were based on "data dredging", was this made clear?	Yes	Yes	Yes
In trials and cohort studies, do the analyses adjust for different lengths of follow-up, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?	Yes	Yes	Yes
Were the statistical tests used to assess the main outcomes appropriate?	Yes	Yes	Yes
Was compliance with the intervention/s reliable?	Not known	Not known	Not known
Were the main outcome measures used accurate (valid and reliable)?	Yes	Yes (apart from YARC fluency)	Yes

Were the subjects in different intervention groups or were they recruited from the same population?	Yes	Yes	Yes
Were study subjects in different intervention groups or were they recruited over the same period of time?	Yes	Yes	Yes
Were study subjects randomised to intervention groups?	Yes	Yes	Yes
Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	Yes	Yes	Yes
Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	Yes	No	Yes
Were losses of subjects to follow-up taken into account?	Yes	No	Yes
Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?	Not known	Not known	Not known
Total score out of 27	22	19	21